

## ABC of breast diseases

### Screening for breast cancer

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Lack of knowledge of the pathogenesis of breast cancer means that primary prevention is currently a distant prospect for the majority of women. Early detection represents an alternative approach for reducing mortality from this disease.

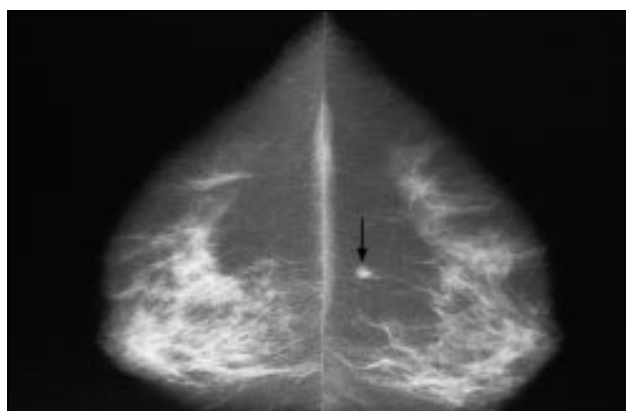
### Methods of screening

There is no evidence that clinical examination, breast ultrasonography, or teaching self examination of the breast are effective tools for early detection. However, randomised controlled trials have shown that screening by mammography can significantly reduce mortality from breast cancer by up to 40% in those who attend. The benefit is greatest in women aged 50-70 years. Published data from the combined Swedish trials showed an overall reduction in breast cancer mortality of 29% during 12 years of follow up in women aged over 50 who were invited for screening.

Screening tests should be simple to apply, cheap, easy to perform, and easy and unambiguous to interpret and should identify those with disease and exclude those without. Film screen mammography requires high technology equipment, special film and dedicated processing, highly trained radiographers to perform the examinations, and highly trained readers to interpret the films. Mammography is at present the best screening tool available and was the first screening method for any malignancy which has been shown to be of value in randomised trials. The potential benefits of digital mammography remain to be evaluated.

*This is one of three completely updated chapters from the new edition of the BMJ book ABC of Breast Diseases. The first was published last week, and the third will appear next week.*

**The aim of screening is to reduce mortality from breast cancer by detecting and treating it when it is small and before it has had the chance to spread**



Small carcinoma found on screening (arrow)

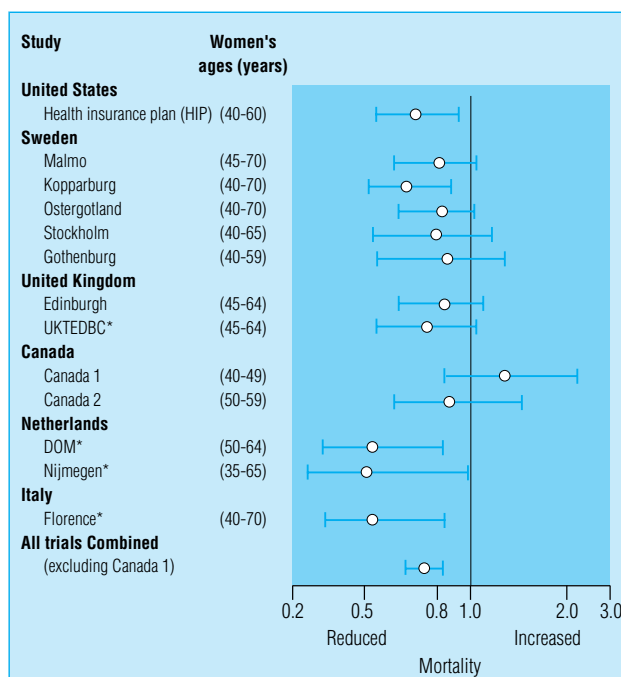
### Organisational aspects of screening

Over 70% of the target population must accept the invitation to participate if screening is to reduce mortality significantly, and the cost per life year saved rises if fewer participate. To achieve optimal participation accurate lists of names, ages, and current addresses are required. Factors affecting attendance for screening include the level of encouragement by general practitioners, knowledge about the screening programme, and the views and experiences of family and friends. Screening programmes must include the initial screening process, assessment of screen detected abnormalities, and clearly defined treatment pathways.

#### Organisation of screening

- Accurate population lists
- Encouragement by general practitioners to attend
- Clear screening protocols
- Agreed patterns of referral
- Well trained multidisciplinary assessment team
- Built in quality assurance
- Continual audit and education

Standards must be set to ensure that targets for mortality reduction are achieved and that there is quality assurance at each stage of the screening process. Screening and assessment should be carried out by multidisciplinary teams experienced in the management of breast disease. Specific training and regular education programmes related to screening should be



Summary of 7-12 years' mortality data from randomised and case-control(\*) studies of breast cancer screening. Points and lines represent absolute change in mortality and confidence interval

mandatory for all professionals involved and there should be regular audit and review of individual and programme results and performance.

## Recommendations for screening

### Age range

Current data indicate that the reduction in mortality is greatest in women aged 50-70 (29%). A smaller reduction in mortality of 24% is achievable in younger women (40-50), but screening is less cost effective because of the lower incidence of breast cancer in these women. In Europe the consensus view is that mammographic screening of younger women on a population basis cannot be justified.

### Frequency of screening

The interval between mammographic screens was selected from evidence from the Swedish studies. A UKCCCR trial comparing annual with standard triennial mammographic screens has shown a small and insignificant advantage to annual screening of women. For women aged 50 to 60, the appropriate screening interval is likely to be between two and three years. Screening in women aged under 50 may need to be repeated more frequently.

### Screening method

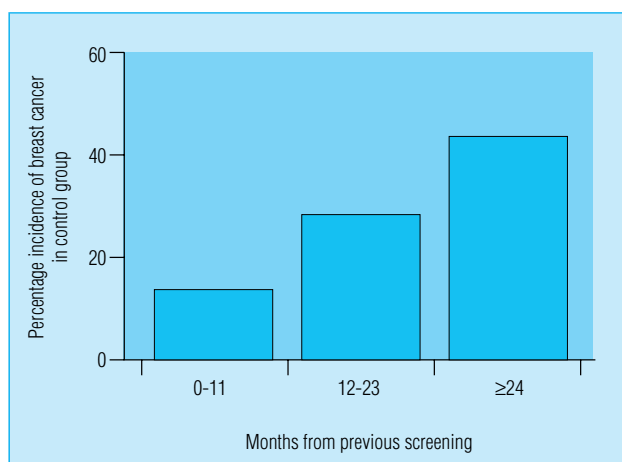
There is clear evidence that two mammographic views of each breast (mediolateral oblique and craniocaudal) significantly improves both sensitivity, particularly for small breast cancers, and specificity. A comparison of performance in screening units in the UK demonstrated a 42% increase in the detection of carcinomas measuring < 15 mm in those using two views. The additional radiation dose of two-view mammography is only of concern in the few women with large dense breasts. Data from the UK screening programme also indicate significant improvements in small cancer detection rates when the mammographic film density is between 1.4 and 1.8. Double reading of films improves sensitivity by 5-10%.

## The basic screen

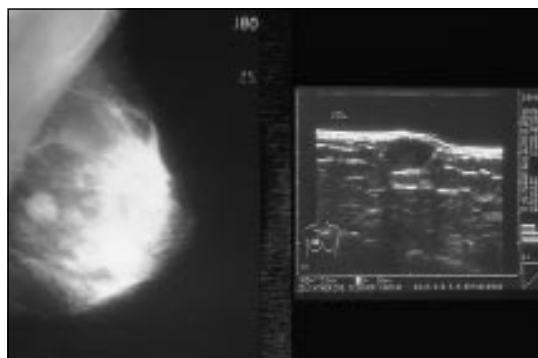
The first part of screening is the basic screen. The radiologist is responsible for ensuring appropriate levels of sensitivity and specificity. Among women aged 50-52, a minimum of 36 invasive cancers and four ductal in situ cancers (DCIS) should be detected for every 10 000 attenders at an initial (prevalent) screen. At subsequent screens (age 53-64) at least 40 screen detected invasive cancers and five DCIS per 10 000 are expected. More than 50% of all invasive cancers detected should be less than 15 mm in diameter (measured pathologically). Recall rates for assessment should be less than 7% among prevalent attendees and less than 5% at subsequent screens. Women with a "normal" screening outcome should be informed of their result by letter within two weeks. Patients judged to have an important abnormality require further assessment.

There are only two possible end points to assessment: no significant abnormality or a diagnosis of breast cancer.

Assessment should be by the triple approach combining further imaging (mammography and ultrasound) with clinical examination and proceeding to needle biopsy where indicated. Assessment is best carried out by a dedicated assessment team consisting of an experienced radiologist, surgeon, and pathologist supported by radiographers and a breast care nurse.



Rates of interval cancer after a negative screen in women aged 50-69



Discrete lesions identified on screening. Ultrasound of the lesion showed it to be benign

### Detection of breast cancer in women aged 50-64 after an initial screen

	No of women
Initial screen	10 000
Recall for assessment	500-700
Surgical biopsy for diagnosis	< 100
Breast cancer detected	50-60

Approximately two thirds of screen detected abnormalities prove to be unimportant on further mammography or ultrasound examination. When a significant abnormality is thought to be present, diagnosis by either fine needle aspiration (FNA) or needle core biopsy should be attempted after clinical assessment. Automated wide bore (14 gauge) needle core biopsy provides a histological diagnosis which has the advantage of differentiating invasive from in situ disease, but unlike FNA the result cannot be made available immediately. An 11 gauge vacuum assisted biopsy device is now available which, because it provides more tissue, increases the diagnostic yield when biopsying microcalcification. Core biopsies should be x rayed to ensure sufficient calcification has been sampled.

Image guided biopsy of impalpable lesions using ultrasound, or x ray stereotaxis for abnormalities not visible on ultrasound, is highly accurate. Up to 70% of important abnormalities detected by screening are impalpable, and image guided fine needle aspiration or core biopsy is necessary. Impalpable lesions may be localised by ultrasonography if visible on this modality or by mammography. Ultrasound guided biopsy is the method of choice as it is more accurate, quicker, easier to perform, cheaper, and associated with less patient discomfort than x ray guided techniques. Ultrasound is also an accurate means of performing needle biopsy of palpable abnormalities. For a small number of lesions, such as calcifications and architectural distortions, neither FNA nor needle core biopsy provides a clear diagnosis, and in these cases vacuum core biopsy sampling (such as the Mammotome probe) or very wide bore biopsy (such as the ABBI system) may be considered. Stellate lesions should be excised even when the FNA at core biopsy indicates benign disease to ensure a cancer is not missed. The vast majority of benign lesions can be diagnosed by these techniques, and open surgery to establish a diagnosis should be avoided. For malignant lesions definitive preoperative diagnosis can be achieved in over 95% of invasive cancers. The minimum standard for preoperative diagnosis of cancers in the NHSBSP is 70%.

### Palpable lesions

Fine needle aspiration of palpable lesions is usually carried out freehand but can be image guided if there is doubt that the palpable lesion coincides with the radiological abnormality. Image guided aspiration is of value if the first freehand aspiration fails to achieve a definitive diagnosis. There may be advantages to having the results of fine needle aspiration cytology reported immediately.

### Multidisciplinary assessment

When results of all diagnostic procedures are available, they are discussed by the multidisciplinary team, who together decide on appropriate management. Preoperative diagnosis of cancer facilitates informed patient counselling and choice of treatments; it also allows the surgeon to plan definitive treatment as a one stage surgical procedure in most patients and avoids the need for frozen section.

### Localisation biopsy and excision

Impalpable lesions need to be localised for surgery. This can be achieved by placing a hooked wire under image guidance in the tissues adjacent to the lesion. The surgeon can then identify the site of the abnormality and excise it. Accurate placement of the localising wire is essential. A variety of wire localization systems are available.

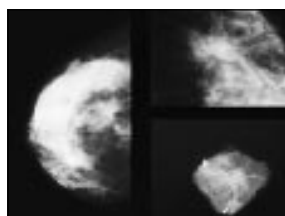
If the procedure is being performed to establish a diagnosis, a small representative portion of the lesion is excised through a small incision, so leaving a satisfactory cosmetic result if the lesion proves to be benign (the European surgical quality



Impalpable stellate lesion detected by screening. Lesion is either a radial scar or an invasive carcinoma, and so excision is required even if results of cytology or core biopsy are reported as benign



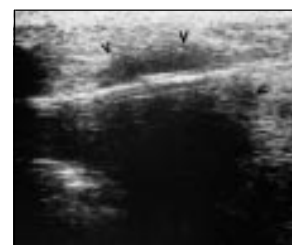
Histology of radial scar



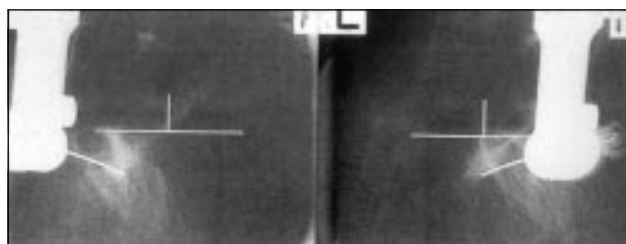
Patient with a stellate lesion seen on mammography (left). Diagnostic work up included a magnification mammograph (top right). The lesion was investigated and found to be a cancer and then excised—specimen x ray showing complete excision (bottom right)



Fine needle aspiration: performed freehand (left) and guided by ultrasound image (right)



A core biopsy low power (left), high power (right) showing an invasive lobular carcinoma



Radiographs for stereotactic guided fine needle aspiration. Needle can be seen penetrating the lesion

assurance guidelines requires such diagnostic surgical excision specimens to weigh less than 30 g). In therapeutic excisions the lesion should be excised with a 10 mm margin of normal tissue. Intraoperative specimen radiography is essential, both to check that the lesion has been removed and, if cancer has been diagnosed, to ensure that an adequate wide local excision has been performed.

## Benefits and potential drawbacks of screening

### Characteristics of screen detected cancers

Compared with symptomatic cancers, screen detected cancers are smaller and more likely to be non-invasive (in situ), while any invasive cancers detected are more likely to be better differentiated, of special type, and node negative. The ability of screening to influence mortality from breast cancer indicates that early diagnosis identifies breast cancers at an earlier stage in their evolution when the chances of metastatic disease being present is smaller.

### Histological types of screen detected and symptomatic breast cancers

Type	Screen detected carcinoma	Symptomatic carcinoma
Non-invasive	21%	3%
Invasive:		
Special type*	27%	12%
No special type	52%	85%

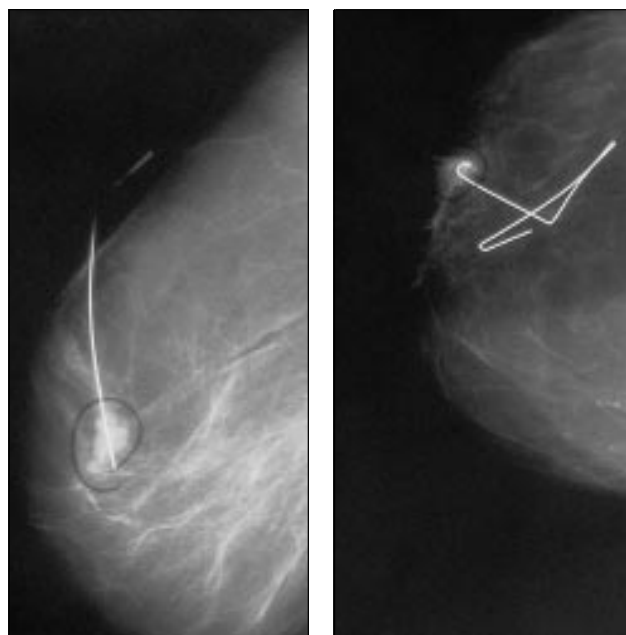
\*These have a better prognosis than cancers of no special type and include invasive tubular, cribriform, medullary, mucoid, papillary and microinvasive cancers.

### Percentage of invasive cancers

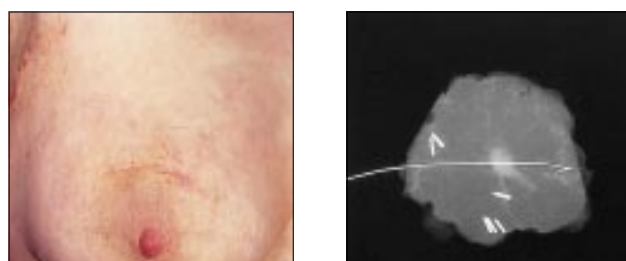
	Screen detected (n=150)	Symptomatic presentation (n=306)
Grade		
I	26	12
II	38	35
III	36	54
Lymph node		
Negative	80	58
Positive	20	41
Median size (mm)	15	20
NPI		
Good	46	24
Moderate	48	53
Poor	5	22

### Psychological morbidity induced by screening

No increase in anxiety has been found in women invited to attend breast screening. There does appear to be a short term increase in anxiety associated with recall for assessment, but, by three months after attending for assessment, women who are shown to have no important abnormality (false positives) are no more anxious than control women. It has been suggested that the excess years as a breast cancer patient caused by a cancer being diagnosed earlier might diminish a patient's quality of life, but the psychological morbidity in women with screen detected breast cancer has been reported to be similar to or less than that in age matched controls.

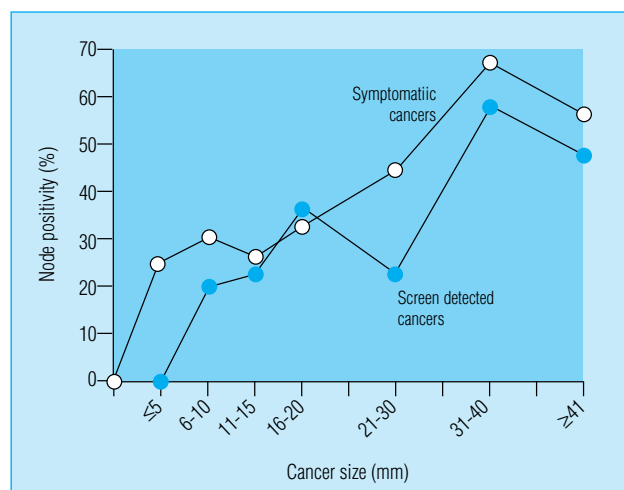


Mammogram after placement of hooked wire adjacent to mammographic lesion. Lateral (left) and craniocaudal (right) views



Cosmetic result of recent diagnostic excision biopsy—small scar and no loss of tissue

Specimen radiograph of therapeutic excision showing wide clearance margins around impalpable lesion. Ligacips aid orientation—1 anterior, 2 medial, 3 inferior



Relation between node positivity and tumour size for screen detected and symptomatic breast cancers



### Risks of mammography

It has been calculated that for every two million women aged over 50 who have been screened by means of a single mammogram, one extra cancer a year after 10 years may be caused by the radiation delivered to the breast. Compared with an incidence of breast cancer that approaches 2000 in every million women aged 60, this risk is very small.

### Unnecessary biopsies

A proportion of women who undergo biopsy will be found not to have cancer, but in Britain the number of women undergoing a biopsy for benign disease is small. The proportion of benign biopsies performed in a screening programme should be monitored and compared with that in an unscreened group of women of the same age. Women who require biopsy are likely to be extremely anxious, but there is no evidence that this anxiety is sustained if the results are benign.

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The ABC of breast diseases is edited by J Michael Dixon, consultant surgeon and senior lecturer in surgery, Edinburgh Breast Unit, Western General Hospital, Edinburgh.

The sources of the data presented in illustrations are: J M Dixon and J R C Sainsbury, *Handbook of Diseases of the Breast* (Churchill Livingstone) 1993:86 for the graph of results of trials of screening; L Tabar et al, *Br J Cancer* 1987;55:547-51 for the graph of rates of interval cancers between screens; T J Anderson et al, *Br J Cancer* 1991;64:108-13 for the graph of node positivity and cancer size for screen detected and symptomatic cancers; and N E Day, *Br Med Bull* 1991;47:400-17 (copyright British Council) for the table of observed and expected detection of cancer by screening. The data are reproduced with permission of the journals or copyright holders.

### Results from breast screening programme in 1997-8 for women aged 50 to 64 years

No of women screened	1 350 204
No of women recalled	71 255 (5.3%)
No of cancers detected	7932
Cancer detection rate	5.9 per 1000
No of invasive cancers expected	5910 (SDR 1.0)
No of invasive cancers found	6220 (SDR 1.05)
No of benign biopsies	2212
Benign biopsy rate	1.6 per 1000

### Key references

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*BMJ* 2000;321:689-93

### A memorable patient

#### Misery versus pleasure

Mrs Kablunshki has been my patient for many years. Never would I call her Emma. Just as she would not call me Claus. Somehow, we grow old together. I know many, perhaps all her woes. It's a litany so familiar to so many in primary care—chronic obstructive lung disease, coronary heart disease and heart failure, hypertension, diabetes mellitus, osteoporosis, and so on. You'd think she could not smile. Yet, when I enter her hospital room, that's what greets me, her faint and sometimes beaming smile. Occasionally, she pushes the nasal prongs upward, like a scholar putting the glasses on the forehead when someone interrupts. For a short time she does well without supplemental oxygen. It seems to me that what she likes best and perhaps even needs the most from me is that we talk. It does not show up in the bill that I sit at her bedside for quite some time and my note in her chart is comparatively sparse, yet to the point. It is the all too common story for an elderly patient "it was just too tough." A couple of days in the hospital, a bit of fine tuning with diuretics, some diligent adjustment of her long list of medications and home she goes.

Home to what? Assisted living. Pride prevents her from going to a fully fledged nursing home and also prevents her from using a wheelchair. So she hobbles with a walker. Quite an accomplishment for 200 elderly pounds on swollen legs with brittle bones and limp muscles. Is life still a pleasure? With a little chuckle: "Yes." What is pleasure? Oh, not much. She loves sweets and chocolate. Her daughter went all over town to find diabetic Easter eggs. They are okay but not for real. And the cooking? All the fat is trimmed or replaced by something of lesser taste. No salt. And if we don't pay attention her diabetes gets quickly out of

control, especially when we have to give her a short course of corticosteroids. I imagine her food if properly prepared must taste like wet paper hankies. What is left? Heaven forbid, no more smoking. A glass of wine? It's not on the hospital's menu. A hike in the woods? Dancing? A long, long time ago.

Is this what medicine is all about? Are we too shy or too strict to allow our patients the freedom to decide and indulge what they really like? Must we make them feel guilty when they enjoy life's little pleasures? Sure, her endothelium doesn't like it when her blood sugar is 472 mg/dL. So we chase it with insulin and feel reinforced to plead for dietary restrictions. Her lipids are high anyhow—could we add a statin and still let her eat what she wants?

Are we too busy postponing death and adding years to life rather than life to years? I hope I find a heretic when my time comes and I need medical help with some long lasting incurable illness, someone who lets me enjoy my pleasures without making me feel guilty and miserable.

Claus A Pierach *professor of medicine, Minneapolis, USA*

We welcome articles of up to 600 words on topics such as *A memorable patient*, *A paper that changed my practice*, *My most unfortunate mistake*, or any other piece conveying instruction, pathos, or humour. If possible the article should be supplied on a disk. Permission is needed from the patient or a relative if an identifiable patient is referred to. We also welcome contributions for "Endpieces," consisting of quotations of up to 80 words (but most are considerably shorter) from any source, ancient or modern, which have appealed to the reader.